Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

A COLLECTING TRIP TO PATAGONIA, SOUTH AMERICA.

By H. T. MARTIN, University of Kansas, Lawrence.

Read (by title) before the Academy, at Topeka, December 31, 1904.

SINCE Darwin's description, in 1843, of the fossils discovered by Captain Sullivan in the Santa Cruz formation near Gallegos, Patagonia, very little has been known of the fossils of that country, until the publication of Doctor Ameghino's work, in 1889, fully describing and figuring the then known fossils from these beds. Unfortunately very little, if any, of this highly interesting and unique fossil fauna had reached this country, either for study or publication, until in 1896 my late lamented friend, Dr. J. B. Hatcher, then at Princeton University, determined on a trip to this far-off country in search of the hidden treasures deposited in the clay-banks and on the beach at the base of the bluffs forming the coast of the Atlantic. This was the first of a series of three trips made by him to this rich collecting ground, and the first sent out for systematic work by any institution from North America. The success of these trips is plainly to be seen in the valuable collections brought back by his party, and the geological and stratigraphical information obtained and published by Princeton University.

After carefully reading over the narrative of the above trips, I determined to make a trip to this Mecca of fossils; so, making all arrangements to this end, I left New York, on steamer "Afghan Prince," in September, 1903, accompanied by Mr. S. Adams, of Topeka, who went along to collect zoölogical material, and reached Buenos Ayres September 20, where we disembarked. While here we visited the National Museum, at this city, and were very courteously treated by its director, Doctor Ameghino. Leaving Buenos Ayres, we traveled overland *via* the Southern railroad to Bahia Blanca, a distance of some 500 miles, where we were unfortunately detained for two months awaiting our camping outfit. However, January 2, 1904, saw us again aboard ship, this time the steamer "Chubut," bound for Gallegos, Patagonia, which we reached the 23d of the same month.

Between Bahia Blanca and Gallegos we called at the following points of interest, from each of which a small collection of whatever material available was secured: San Blas, Port Madrin (port of entry for the Welsh colony), Caboroso, St. Elena, Camarones, Commodore Rivadavia (port of entry for the Boer colony), Cabo Blanco, Deseado (so graphically described by Darwin), San Julian (or Darwin station), Santa Cruz, and Rio Gallegos. After spending a few uncomfortable days at Gallegos, experiencing many difficulties getting our camping outfit together, and breaking our four South American horses to the use of the farm wagon which we shipped from New York, we at last proceeded happily on our way to our first collecting ground, which lay directly across the river from us. As we drove along the south side of the river for a distance of some fifteen miles, the bluffs of the north side were plainly to be seen. These are composed of the Santa Cruz formation, with a capping of the ever present shingle, as illustrated in plate IX. Crossing the river at Weir Aike, we reached, after a drive of fifteen miles, the estancia of Mr. H. S. Felton, where we were very hospitably received. Here we made our first camp in Patagonia (see plate VIII), and for two months collected in the remarkably rich but steep bluffs forming the south escarpment of the river. Here I secured a great number of the smaller mammals, a large part of which must be collected during low tide at the base of the cliffs and on the clayey bed of the river, which are continually being eroded away by the constant wash of the incoming and outgoing tides. In this latitude the tides reach the enormous rise and fall of over fifty feet. In the photograph, plate X, showing the bluffs at low tide, the high-tide mark can be plainly seen about twenty feet from the base of the cliff. These bluffs at high tide are shown in plate XI.

In March we moved our camp to the estancia of Mr. John Rudd, at Cape Fairweather, two days later moving to a point two miles north of Cape Fairweather, on the coast of the broad Atlantic. Here an interesting sight met our view. Away off to the southwest glistened the snow-capped tops of a high range of hills, while at the foot of the bluffs, which here attain the height of 400 to 450 feet, rolled the huge breakers of the ocean. The waves at each spring tide undermine the very hills we stood upon, while again at low tide the receding waters leave a beach of from three-fourths to one and one-half miles wide, at many points washed clear of loose sand, to the hard greensand and clay-beds of the Santa Cruz. This makes it one of the most unique collecting grounds imaginable, and in many instances beautiful little fossil skulls are left on a raised base of matrix, standing out like clear-cut cameo.

The mode of collecting in this locality differs greatly from the methods which must be used in the semi-arid region of western Kansas. Clad in oilskins and with the indispensable rubber boots on, one frequently has to dig out a fine fossil in some little pool of water formed by a slight depression in the surface. The contrast between this and the chalk of western Kansas can be better imagined than described, although I have very vivid recollections of many such occurrences. From Cape Fairweather north for thirty miles the beach afforded the best and most remunerative collecting ground. Each day, as the time-varying tide slowly receded, found me at my post, following up the water's edge, hunting up and digging out the fossils as fast as exposed to view, placing them on raised blocks of clay (dug up for the purpose) or on one of the many hard concretions left standing from a foot to five feet high to drain and partially dry. At the turn of the tide, driven back by the now incoming waves, one often finds himself knee-deep in the surf before the last fragment of bone belonging to some rare beast, left on the raised pedestal to dry, has been placed in safety in the collecting bag, then on to the next pile of bones, always in a hurry to beat the oncoming waves, and so on until all the fossils previously dug out are safely cared for. These are then carried to camp, perhaps ten miles away, on horseback, dried out, well soaked with a thin solution of gum arabic, again thoroughly dried, and lastly carefully packed, not forgetting to put a plenteous supply of cotton batting around the more exposed parts.

During the very high tides great care must be taken to have in view a place of safety for one's self and horse against the incoming tide. Several times I have had to lead my horse with great difficulty up the steep banks to some little ledge for safety, there to wait from two to three hours for the falling of the tide, which would allow us to pass along at the foot of the cliffs to one of the very few places, often miles apart, where it is possible for a horse to climb to the pampas above.

Twenty miles north of Cape Fairweather, as illustrated in plate IX, the uppermost formation is the so-called shingle, composed of water-worn pebbles, intermixed with sand and clay, forming a layer of varying thickness of from 2 to 100 feet, which covers nearly the whole of Patagonia. Beneath this are the Cape Fairweather beds, of Pliocene age. These are of marine origin, composed of a reddish sandstone, thirty to thirty-five feet in thickness, literally packed in places with a rich and varied collection of invertebrate remains—brachiopods, gastropods, and oysters of giant size, of which a good series was secured. Below these lie the Santa Cruz beds, composed of many different colored stratified clay sand sandstones, of fresh-water origin, the colors varying from blue to brown and gray, the grayish white predominating.

The period of the explorations was unfortunately cut much shorter than anticipated, owing to our being two months later in the field than intended, and on account of the severe winter setting in, making it impossible to collect on the cold, wet beach. Consequently, in June, everything was packed, and shipped *via* Punta Arenas to New York. The first week in June we bade farewell to this land of strange living and fossil mammals and birds, and sailed away on our homeward voyage, not, however, without a lingering regret that time and circumstances had not allowed us to accomplish more for the advancement of science.

The specimens now placed in the University Museum are entirely new to the collection. These, when cleaned, will be described and figured in the *University Quarterly.* The following is a partial list of these new acquisitions:

VERTEBRATES.

Santa Cruz beds:
- Astrapotherium.
- Toxodon.
- Diadaphoreus.
- Nesodon.
- Protypotherium.
- Typotherium.
- Hegetotherium.
- Pachyrucose.
- Lagastomus.
- Planops.
- Hapalops.
- Hoplophoreus.
- Scelidotherium.
- And several other edentates.

INVERTEBRATES.

Cape Fairweather beds:
- Balanus cævis.
- “ varians.
- Cardeta elegantoides.
- Cancellaria gracilis.
- Crepidula dilatata.
- Pecten giminatus.
- Terebratella patagonica.
- “ gigantea.

Patagonia beds, San Julian:
- Terebratella patagonica.
- Scutella patagonensis.
- Pecten prænuncius.
- Scalaria rugulosa.
- Turritella patagonica.
- With many others not yet identified.

PLATE VIII —First Camp in Patagonia of University of Kansas Expedition.

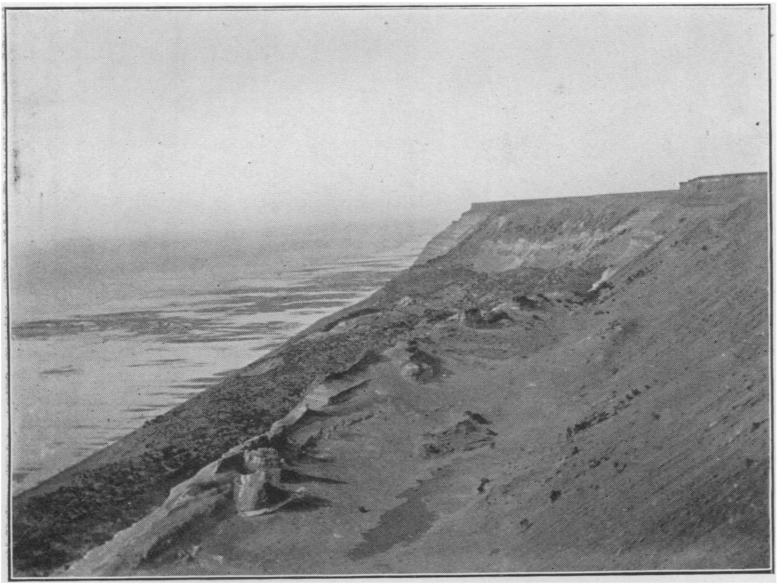

PLATE IX.—Cliffs on Atlantic Coast of Patagonia Twenty-five Miles North of Cape Fairweather.

(The thin dark layer on top is shingle; then thirty to thirty-five feet of the Cape Fairweather beds, sandy in character; from this down to base of cliff is the Santa Cruz formation. To the left is the beach at low tide, where the fossils of the Santa Cruz beds were found.)